

Research Article

Effect of different levels of protein diets on growth performance and carcass yield of pateri male goat kids

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Abstract

The aim of present study was to determine the proper crude protein level for the male Pateri kids. Twenty four male Pateri goat kids were selected with an initial weight 15.4 ± 0.4 kg and randomly distributed in three supplemented diets with i.e. 11.5 (A), 14.5 (B) and 16.5 % (C) crude protein level. Dry matter intake, average daily gain, feed conversion ratio, total weight gain, carcass characters and digestibility were studied for 60 day's trial. Statistical analysis indicated that there was no significant effect ($P > 0.05$) of protein levels on dry matter intake but, maximum daily dry matter intake was 707.9 g (11.5% CP level). However, ADG, feed efficiency and total weight gain showed significant ($P < 0.05$) effect, higher weight gain 22.04 kg, average daily gain 110.66 g and better feed efficiency 6.17 (16.5% CP level) was recorded. Furthermore, there was no significant difference ($P > 0.05$) of protein levels on carcass weight and dressing percentage but, numerical variations were recorded. There was significant ($P < 0.05$) interaction of proteins on digestibility of crude protein and ether extract but no effect ($P > 0.05$) on ADF and NDF was noted. Therefore, it was concluded from present results that 16.5% C.P level is beneficial for growth performance, carcass yield and digestibility.

Keywords: Crude protein; Male Pateri kids; Performance and digestibility

Introduction

Goats have numerous breed which are distributed and reared in the different regions of the world for their high demanding consumption of meat [1]. The production potential and efficiency of goats are very low in many countries of the world in primary and post production systems [2]. The meat of goat is also called chevon and it contain less muscular fat and more muscle shear power [3]. Goat meat is healthier and contains less fat than beef and sheep meat (mutton) for that reason human like and consume goat meat [4]. Pateri goats are mostly found in Sindh provinces. Especially poor peoples raised for milk and meat purpose. For the occasion of Eid-ul-Uzza Pateri male kids are raised by rural peoples for fattening purpose and then generate income through their sale.

Protein is very much important nutrient for the fattening animals; the ration should be formulated on the basis of dry matter and crude protein levels. When protein taken by animals they digested and absorbed by the rumen and then converted into amino acids which are necessary for the normal growth and development of muscles [5]. The proper ratios of protein supply to the ruminant animals to increase the growth and milk production, which is suitable for achieving more profit from livestock [6]. In general, protein is necessary for normal growth development for animals and the adequate amount of protein required for fattening purpose. Earlier research stated that ideal levels of crude protein in the ration are 14, 16 and 20.3 percent best for growth and fattening [7-9]. Out of all nutrients particularly protein has major advantage to increase the mutton production. Hence, usage of high levels of protein in the daily feeding allowances by the commercial farmers to achieve more growth rates [10]. Documentation on requirements of protein of Pakistani goats especially Pateri goat

breed are very little information especially about crude protein to obtain good quality and more amount of mutton/meat by these kids in Pakistani environments. Therefore, the objective of this research work was to investigate effects of different CP levels on the growth and performance and carcass yield of Pateri male goat kids.

Materials and methods

The research trial was carried out for the period of 60 days at the livestock experimental station Sindh Agriculture University Tandojam. The feed samples of experimental diet were brought in animal nutrition laboratory for determination of chemical composition according to analytical methods of Association of Official Analytical Chemists [11].

A total 24 male of Pateri kids were allocated in three different groups A, B and C for experimental purpose. Each group consists of 08 kids and their average age was about 04 months. The each kid was confined in separate pen for feeding and feces collection for recoding of feed intake and for digestibility during whole research trial. The ration was formulated on the basis of different levels of crude protein i.e. (11.5, 13.5 and 16.5 CP %) according to experimental design. The formulation and chemical analysis of experimental diet are shown in Table 1. The experimental diet consists of berseem and concentrate. Before the starting of experimental period all kids were weighed and treated against internal and external parasites with Nilzan plus and Ivermectin. During the experiment feed offered 9:00 am and 5:00 pm daily, refusal feed was measure and subtracted from total feed for calculation of feed intake. Free choice supply of clean water to each kid thought out the experiment. The body weight of all kids were measured early in the morning before feeding. During the last week of experiment feces were collected and analyzed for determination of digestibility.

The collected fecal samples were brought to Laboratory of Animal Nutrition for determination of proximate analysis for the digestibility. The protein was determined by the kjeldhal method, ether extract through the soxillet apparatus and crude fiber (ADF & NDF) by the method of Van Soest [12]. At the end of experiment 03 kids were slaughtered from each group for measure carcass weight the dressing percentage of

meat. The following parameters were recorded during the entire period of study, dry matter intake, feed efficiency (FCR), weight gain, digestibility, carcass weight and dressing percentage. Obtained data were tabulated and analyzed by ANOVA and the means of different treatment were used for LSD at 5% level of significant through STATISTX, Version 8.1 (Copyright 2005, Analytical Software, USA).

Table 1. Feed ingredients and feed formulation for experimental animals

Ingredients	A	B	C
Cotton seed cake	05	12	16
Maize	20	25	20
Wheat bran	15	12	20
Rice bran	13	12	14
Rice crush	22	18	07
Wheat crush	11	10	08
Soybean	00	02	06
Molasses	10	05	05
Berseem	04	04	04
Total	100	100	100
Calculated DM and CP percentage			
DM	86.1	86.8	86.7
CP	11.5%	14.5%	16.5%

Results and discussion

Growth performance

The influences of different levels of protein on growth performance are given in Table 2. Statistical analysis revealed that there was no significant ($P>0.5$) effect of treatments on dry matter intake. In general, dry matter intake increased with crude protein level increased in the diet [13, 14]. Present findings are in contrast with above researchers. These results are agreed with Ahn *et al.* [15] and Choi *et al.* [16] who noted that feed consumption was non-significant in sheep and Korean black goats with different crude protein ratio in their diet. These findings are accordance with the Prieto *et al.* [7] and Chobtang *et al.* [17] they observed that various ratios of protein in the diet did not affect significantly the dry

matter intake in the Thai indigenous male goats, Spanish and Boer-Spanish crossbred kids. Same results were also detected by Zundit *et al.* [18] who noted no significant influence on feed intake with higher dietary C.P level in growing lambs. Rocha *et al.* [19], did not observed impact of protein levels (14, 16, 18, and 20% CP) on dry matter intake. However, ANOVA for the average daily gain and final body weight showed significant ($P<0.05$) difference among the treatments. These results showed that more protein level in diet results in better weight as compared with low protein ratio in the feed of goats. Shahjalal *et al.* [9], reported that diet with 16.9 and 20.35 crude protein in black Bengal goat results in more live weight gain with higher dietary protein (20.3%). Protein plays important role in

muscle development and is essential for growth of animals [20]. Mostly, animals in early growth more protein deposit in their body, which indicates that they can absorb diets with more protein ratio [21]. Jia *et al.* [22], reported that 16% C.P level in Angora goat kids got more weight compared with other groups. Present findings are harmony with the results of Titti *et al.* [8], Choi *et al.* [16], and Wildeus *et al.* [23] who reported that increased level of crude protein in goat diet results in more weight gain. Negesse *et al.* [24], reported that more average daily gain in Saanen kids with higher protein ratio (17.6%) in feed. Furthermore, there was significant ($P<0.05$) effect of treatments for

feed efficiency. The best feed conversion ratio was recorded in group feed with 16.5% crude protein diet as compared to other groups. These results are supported by AbebeTafa *et al.* [25] and ErmiasTekletsadik [26], who reported that feed intake and growth performance increased in Arsi-bale lambs provided higher protein level in comparison with low protein ratio. These findings are also agreed with the results of [27]. Keser *et al.* [28], found that live body weight, average daily gain and FCR were best for lambs fed the 16% crude protein diet in comparison with lambs fed 10%.

Table 2. Effect of crude protein levels on growth performance of male Pateri goat kids

Variables	Groups of male Pateri kids with crude protein levels			
	A (11.5%)	B (14.5%)	C (16.5%)	S.E±
DMI (g/d)	707.90	696.05	682.15	8.597
ADG (g/d)	95.05 ^b	102.61 ^{ab}	110.66 ^a	3.095
FCR	7.47 ^a	6.80 ^{ab}	6.17 ^b	0.233
Total weight (kg)	21.12 ^b	21.86 ^{ab}	22.57 ^a	0.238

Super script with different letters indicated significant level ($P<0.05$). DMI: Dry matter intake; ADG: Average daily gain and FCR: Feed conversion ratio

Nutrient digestibility

The utilization of crude protein and ether extract in terms of digestibility indicated linearly significant ($P<0.05$) difference among the supplemented groups except ADF and NDF (Table 3). The apparent digestibility of crude protein and E.E was higher in C group. [9], reported that diets supplemented to goats with higher protein levels results in higher values for the

digestibility of crude protein and ether extract compared with low protein diet. These findings are well agreed with [29] who found that 12 and 15% crude protein ratio in feed of goats improved the digestibility of C.P in comparison with 10% level. Increase level of C.P in diet stimulates the microbial fermentation activity and synthesis of microbial protein.

Table 3. Effect of crude protein levels on digestibility percentage of male Pateri goat kids

Variables	Groups of male Pateri kids with crude protein levels			
	A (11.5%)	B (14.5%)	C (16.5%)	S.E±
C.P	66.72 ^b	69.66 ^{ab}	73.97 ^a	1.804
E.E	56.72 ^b	59.30 ^{ab}	63.07 ^a	1.545
N.D.F	55.67	57.40	58.84	1.891
A.D.F	45.82	47.32	49.65	1.454

Super script with different letters indicated significant level ($P<0.05$). C.P: Crude protein; E.E: Ether extract; NDF: Non detergent fiber and ADF: Acid detergent fiber

Effects of treatments on carcass characteristics are illustrated in Table 4. Analysis of variance showed no-significant ($P < 0.05$) effect of treatments on carcass weight and dressing percentage but numerical variation were noted. More carcass weight and dressing percentage was recorded in C group as compared with other treated groups. Dressing percentage is closely interlinked with live body weight at the time of slaughter. Hence, dressing %

increased as live body weight increased at slaughter period [30, 31]. Regarding the previous research conducted by Titti *et al.* [8], Rocha *et al.* [19] and Choi *et al.* [32], they reported that feed contain more protein ratio did not results in significant influence on carcass yield. Furthermore, Wiese *et al.* [33] found that high protein level in lambs not increased the carcass weight and dressing % these findings are harmony with our results.

Table 4. Effect of crude protein levels on carcass weight and dressing percentage of male Pateri goat kids

Variables	Groups of male Pateri kids with crude protein levels			
	A (11.5%)	B (14.5%)	C (16.5%)	S.E±
Carcass weight	11.30	11.96	12.67	0.374
Dressing %	53.50	54.71	56.13	1.323

Conclusion

On the basis of findings of present research it was concluded that, the ideal dietary crude protein level for the better growth, carcass and digestibility percentage is 16.5% for Pateri male goat kids.

Author's contributions

Conceived and designed the experiments: SA Pirzado, M Haroon & M Zakria, Performed the experiments: SA Pirzado, Analyzed the data: M Tariq & D Hussain, Contributed reagents/ materials/ analysis tools: GA Mughal & RA Laghari, Wrote the paper: SA Pirzado, IH Laghari, & F Parveen,

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